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	3,623,046	11/23/1971	Scourtes					
	4,811,921	03/14/1989	Whitaker et al.					
	5,172,092	12/15/1992	Nguyen et al.					
	5,389,849	02/14/1995	Asano et al.					
	5,435,729	07/25/1995	Hildreth et al.			·		
	5,437,608	08/01/1995	Cutler					
	5,731,804	03/24/1998	Rosenberg					
	5,691,898	11/25/1997	Rosenberg et al.					
	5,629,594	05/13/1997	Jacobus et al.					
	5,952,806	09/14/1999	Muramatsu					
	6,216,059	04/10/2001	lerymenko					
	6,246,390	06/12/2001	Rosenberg					
	6,256,011	07/03/2001	Culver					
	6,424,356	07/23/2002	Chang et al.					
	6,448,977	09/10/2002	Braun et al.					
	6,636,197	10/21/2003	Goldenberg et al.					
	7,061,467	06/13/2006	Rosenberg					
	4,262,240	04/14/1981	Arai					
	4,382,217	05/03/1983	Horner et al.					
	4,422,060	12/20/1983	Matsumoto et al.					
	5,184,310	02/02/1993	Takenouchi					
	5,194,786	03/16/1993	Smith et al.					
	5,334,893	08/02/1994	Oudet et al.					
	5,456,341	10/10/1995	Garnjost et al.					
	5,492,312	02/20/1996	Carlson					
	5,554,900	09/10/1996	Pop, Sr.					
	5,649,020	07/15/1997	McClurg et al.					
	5,650,704	07/22/1997	Pratt et al.					
	5,734,236	03/31/1998	Motegi	16/23/2007	MARIE AN C	ededenia in transcription and		
	6,057,753	05/02/2000	Myors			800000002 5	11698	1067
	6,686,901	02/03/2004	Rosenberg	01 FC:1896		180.00 DA		
	4,334,280	06/08/1982	McDonald					
	4,355,348	10/19/1982	Williams					
	5,907,212	05/25/1999	Okada					

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	6,680,729	01/20/2004	Shahoian et	al.				
	6.693,622	02/17/2004	Shahoian et	al.				
	6,437,771	08/20/2002	Rosenberg e	t al.				
	6,704,001	03/09/2004	Schena et a	al.				
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	Form PTO 1449 (Rev. 2-32) U.S. Department of Commerce Patent and Trademark Office					cket No. 0091B (034701-	Serial No. 10/671,465		3 013
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					FOREIGN	PATENT DOCUMENTS		
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INFORMATION DISCLOSURE
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Application Number	Unknown			
Filing Date	September 29, 2003			
First Named Inventor	Alex S. GOLDENBERG			
Group Art Unit	2673			
Examiner Name	Unassigned			
Attorney Docket Number	IMMR-073/02US			

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	Balgrie, "Electric Control Leading - A Low Con All Land	
	I TURNING SYSTEMS CONTENENCE ON 247-254 November Contenence on 247-254 November Contenence of Interservice/Industry	Γ
- 1	C2 Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993	L
	(C3) Russo. "The Design and Implementation of The	ĺ
	pp. 1-131, May 1990, ambived 8/14/00	┝╌
1	MC4 M Brooks et al. "Hand Controllers for Tales	
	Publication 85-11, NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985	
1	AL THE CONTROL OF THE	
	Brain Research, Vol. 79, No. 1, pp. 150-156, 1990 Co Burdea et al. "Distributed in Distributed in Springer International (Springer-Verlag); Experimental	
1		-
	Automation, up. 25-44 05/02/1003	
	Show et al., Model-X Force Reflecting-Hand Committee Band Committe	
	45 pages of attachments, 06/15/1989	
1	(C6)\\ Out-Young, "Force Display in Molecular Death in C	
	UMI Order No. 9034744, p. 1-369, 1990 CO Tadres "Control System Design Description, University of North Carolina at Chapel Hill,	
	1 V 1 TOTAL OF STATE OF THE PARTY OF THE PAR	
	Actuators," MIT Archive, pp. 1-88, February 1990, archived 8/13/90 Caldwell et al., "Enhanced Tactile Feedback Class"	
	pp. 955-960, 1993	_
1	MCIA Adelstein et al. "Design and Implementation of S	
	Vol. 42, Advances in Robotics, pp. 1-12, 1992 Vol. 42, Advances in Robotics, pp. 1-12, 1992 Gotow et al., "Controlled Impedance Test Appendix for Sci. 1.	
1	WAII-11:00, pp. 332-337 C12 Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback,"	_
	C13) Stanley et al., "Computer Simulation of Internation D	
1	Processors, DSC-Vol 42 Advances in Relating Dynamic Mechanical Systems Using Distributed Memory Parallel	
	Kusso, "Controlling Dissipative Magnetic Parish D. A.	
-	1 RODOLLCT, DD. 63-70 ASME 1000	
*	Kontarinis et al., "Display of High-Frequency Tactile Information to Teleoperators," Telemanipulator Technology and Space Telerobotics, Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50. Sep. 7-9, 1002	
1	Space Telerobotics, Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993 C16) Patrick et al., "Design and Testing of A New York Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993	
1 /	C16) Patrick et al., "Design and Testing of A Non-reactive, Fingerity, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui I deFigueignet at 5 5th or Interaction with Remote	
1	213-222, 1990 and 199	
1 }	(1) Adetstein, "A Virtual Environment Sustain For The Co. 1	
1	Mechanical Engineering, MIT, June 1989, archived 3/13/90 C18) Belezy, "Sensors Controls and Market States of Human Arm Tremor," Ph.D. Dissertation, Dept. of	
l	C18) Bejezy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp.	
	(19) Bejezy et al., "Generalization of Bibles I Comp. 10.	
	IFTOMM, Sep. 8-12, 1981	_
*	McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment	
12 1	Manual," JPL 1988, JPL D-5172 C2) Mlasky, "Computational Henrice: The Coults and Controller Equipment	
42		
1	Dissertation, MIT, June 1995, archived 7/6/95 C22 Jacobsea et al., "High Performance Destroy Talents of Synthesizing Texture for a Force-Feedback Display," Ph.D.	
X	Conference & Exposition Hollawood Shadows Telectroottic Manipulator With Force Reflection." Intervention/ROV '91	
/ <i>l</i> //	(23) Shimoga, "Finger Force and Touch Facilities !	
4	C23 Salmoga, "Finger Force and Touch Feedback Issues in Desterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992 18M Technical Disclosure Bulletia, "Mouse Ball-Actuating Design With F.	-
)(C24 IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B,	
1	C25 Terry et al. "Tarrile Fauthant II. C	_
XI		_
10	20 \ Howe, "A Force Reflecting Telegraphy 41 1 2	
	Proceedings of the 1992 IEEE Internation of Conference on the Study of Tactile Sensing in Precision Mammulation	
	27 Eberhardt et al. "OMAR . A Hontis di L. C	
	Reality Annual International Symposium, Scattle, WA, Sep. 18-22, 1993	_

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INFORMATION DISCLOSURE	Application Number	Unknown
TATEMENT BY APPLICANT		September 29, 2003
משר בו	First Named Inventor	Alex S. GOLDENBERG
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	Examiner Name	Unassigned
Nr a TR	Attorney Docket Number	IMMR-073/02US

***	11		
	(C)	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987.	
	\sim	area, "Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987	
- 1	CZS	Bejozy et al., "Kinestheric Counting Retween On the 4, October 1987	f
		Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980 Bejczy et al., "A Laboratory Breedbear Science Scien	
	(CB)	Beigry et al. "A Inhomism P. Inhomism Physics of the Control of th	
1 -		Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houssion, TX, July 25-27, 1989	-
─	GI	Chibana I like	l
1			
7	(03)	Consumer Electronics, Vol. 41, No. 3, August 1995	
		Marcus, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994	
$\mathbf{A} \wedge \mathbf{A}$	CIV	Polymer The Cauting Eage, Sep. 8-11, 1994	
▼ 8	الادسا	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00	
		1987 IEEE, 1987 CH2413-3/87/0000/0318501.00	

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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¹ Unique citation designation number.

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5.M.		4,795,298	1/3/98	Jau	Figures Appear
		4,731,603	3/15/88	McRae et al.	
1		4,706,294	11/10/87	Ouchida	
		4,484,191	11/20/1984	Vavra	
1		4,484,112	8/7/1984	Foerst	
1		4,414,984	11/15/83	Zarudiansky	
		4,333,070	6/1/1982	Barnes	
╂─┼		4,262,549	4/21/1981	Schwellenbach	
1	-	4,127,752	11/28/1978	Lowthorp	
12		3,919,691	11/11/75	Not	· · · · · · · · · · · · · · · · · · ·
V		2,972,140	2/14/1961	Hirsch	
		RE37,374	8/18/01	Roston et al.	

Examiner	Cite	Fc	oreign Patent Doc	zument		1	
initials*	No.	Country Code 3	Number ⁴	(Qad Code ⁴ (# hyomn)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Relevant
		(4)	H2-185278		7/19/1990	Taito Corporation	Figures Appear
		(JP)	H4-8381		1/13/1992	Epoch Co. and Key- Planning Co.	
			H7-24147		1/27/1995	Sega Corporation	
		(WO)	H5-192449		8/3/1993	Talto Corporation	
+			92/00559		1/9/1992		
			0607580	A1	7/271994		
┥			0265011		4/27/1988		
	6/		0626634	A2	5/11/1994		
	99	WO	01/03105		1/11/2001		
		(wo)	01/24158		4/5/2001		
		wo	97/31333		8/28/1997		
	1	CWO	01/13354		2/22/2001		
		(WO)	98/32112		7/23/19.98		
		(wo)	99/40504	1	12/8/1999		
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number. Substitute for form 1449A/PTO Complete if Known Application Number INFORMATION DISCLOSURE 10/671,465 Filing Date STATEMENT BY APPLICANT September 29, 2003 First Named Inventor Alex S. Goldenberg Art Unit 2673 (use as many sheets as necessary)

Attorney Docket Number

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xaminer	Cite No.1	include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	7
	0	PATRICK, "Design, Construction, and Testing of a Fingertip Tactile Display for Interaction with Virtual and Remote Environments," Master of Science Thesis, MIT, Aug. 1990, archived Nov. 8, 1990.	\dagger
	$\sqrt{}$	CALDER, 'Design of A Force-Feedback Touch-introducing Actuator For Teleoperator Robot Control,' Bachelor of Science Thesis, MiT, May 1983, archived June 23, 1983.	+
		WIKER, "Teletouch Display Development: Phase 1 Report," Technical Report 1230, Naval Ocean Systems Center, San Diego, July 1988.	+
	V	BLISS, "Optical-to-Tactile Image Conversion for the Blind," IEEE Transactions on Man-Machine Systems, Vol. MMS-11, No. 1, March 1970.	+
	VP	AMIRL-TR-90-039, August, 1990.	+
		KONTARINIS et al., "Tactile Display of Vibratory Information in Teleoperation and Virtual Environments," PRESENCE, 4(4):387-402, Harvard Univ., 1995.	-
	V	AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180,	-
	$\sqrt{}$	EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, Dynamic Systems and Control: Volume 1, ASME 1994.	L
	VO	26BEL et al., "Tactile Feedback Applied to Computer Mice," International Journal of Human-Computer Interaction, Vol. 7, No. 1, pp. 1-24, 1995.	_
	V04	PIMENTEL et al., "Virtual Resitty: through the new tooking glass," 2" Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.	
V		*Cyberman Tachnical Specification,* Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide, 4/5/1994.	
	V	CUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and its Use in the Virtual Reality Environment," Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95, Seoul, Korea, 21-24 August 1995.	
,	_ A U	KACZMAREK et al., "Tactile Displays," Virtual Environment Technologies, Chap. 9, pp. 349-414.	
		AKE, "Cyberman from Loghech," at http://www.fbiblio.org/GameBytes/saue21/greviews/cyberman.html, 1994.	
N / \overline{I}	1 •	Component Maintenance Manual With Bustrated Parts List, Coaxdel Control Shaker Part no. C-25502," Safe Flight instrument Corporation, Revised 28 January 2002 (3 pages).	

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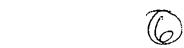
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¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.





PTO/SB/06A (10-01)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless & contains a valid OMB control number. Substitute for form 1448A/PTO Complete If Known **Application Number** INFORMATION DISCLOSURE 10/871,465 Filing Date STATEMENT BY APPLICANT September 29, 2003 First Named Inventor Alex S. Goldenberg Art Unit 2673 (use as many sheets as necessary) **Examiner Name** Unassigned Sheet 5 of | 6 Attorney Docket Number IMMR-073/02US

		OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS
xaminer itlals *	Cite	include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue
7	1.	"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part no. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).
1_	V	SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994
	V	YAMAKITA et al., "Tole-Virtual Resitty of Dynamic Mechanical Model," Proceedings of the 1992 IEEE/RSJ International Conference on Intelligent Robots and Systems, Releigh, NC, July 7-10, 1992
	V	NOLL, "Men-Machine Tactile," SID Journal, July/August 1972 (ssue.
	V	ROSENBERG, "Virtual Fotures: Perceptual Overlays Enhance Operator Performance in Telepresence Tasks," Ph.D. Dissertation, Stanford University, June 1994.
	V	SCHMULT, Brian et al., "Application Areas for a Force-Feedback Joystick," ASME 1993, DSC-Vol. 49, pp. 47-54.
	1	HASSER, Christopher John, "Tactile Feedback for a Force-Reflecting Haptic Display," The School of Engineering, University of Dayton, December 1995, pp. iii-xii &1-96.
		AKAMATSU, M. et el., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display." Presence, Vol. 3, No. 1, 1994, pp. 73-80.
	V,	KELLEY, A. J. et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of Brit. Columbia, 1993, pp. 1-27.
	$\sqrt{}$	HASSER, C. et al., 'Tactile Feedback with Adaptive Controller for a Force-Reflecting Haptic Display,' Parts 1&2, IEEE 0-7803-3131-1, 1996, pp. 526-533.
		RAMSTEIN, C., "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ASSETS '96, 2nd Annual ACM Conf. on Assistive Technologies, 1996, pp. 37-44.
	v ,	DENNERLEIN, et al., "Vibrotactile Feedback for Industrial Telemanipulators," ASME IMECE, 8th Annual Symp. On Haptic Interfaces for Virtual Environment and Teleoperator Systems, Nov. 1997, pp. 1-7.
	V	MBNSKY, Margaret et al., "Feeting and Seeing: Issues in Force Display," ACM 089791-351-5, 1990, pp. 235-242.
	V	DUH-YOUNG, M. et al., "Creating an illustion of Feet: Control lesues in Force Display," Computer Science Dept., University of North Caroline, 1989, pp. 1-14.
	. //	tASSER, C., "Force-Reflecting Anthropomorphic Hand Masters," AL/CF-TR-1996-0110, 1995, pp. 5-31.

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Art Unit 2673 Examiner Name Unassigned Attorney Docket Number IMMR-073/02US

		OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS
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-	T 6-	OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.	include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁷		
		Baigrie, "Electric Control Loading - A Low Cost, High Performance Alternative," Proceedings of Interservice/Industry Training Systems Conference, pp. 247-254, November 6-8, 1990			
	C2	Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993	┢		
	СЗ	Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," MIT Libraries Archives pp. 1-131, May 1990, archived 8/14/90			
	C4	Brooks et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11, NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985			
	C5	Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-156, 1990	┢╌		
	C6	Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, 05/02/1993			
	C7 Snow et al., 'Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 45 pages of attachments, 06/15/1989				
	C8	Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990			
	CO	Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," MIT Archive, pp. 1-88, February 1990, archived 8/13/90			
	C10	Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993			
	C11 Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research Vol. 42, Advances in Robotics, pp. 1-12, 1992				
	C12	Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WAII-11:00, pp. 332-337			
	C13	Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992			
	C14	Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992			
	C15	Kontarinis et al., "Display of High-Frequency Tactile Information to Teleoperators," Telemanipulator Technology and Space Telerobotics, Won S. Kim, Editor, Proc. SPIF Vol. 2057, pp. 40-50, Sep. 7.9, 1992			
	C16	Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui J. deFigueiredo et al, Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990			
	C17	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90			
	C18	Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980			
	C19	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM- IFTOMM, Sep. 8-12, 1981			
	C20	McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL 1988, JPL D-5172			
	C21	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT. June 1995, archived 7/6/95			
	C22	Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991			
	C23	Shimoga, "Finger Force and Touch Fordback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30- Oct. 1, 1992			
	C24	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990			
	C25	Terry et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988			
	C26	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice Emper May 1992			
V	C27	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," IEEE Virtual Reality Annual International Symposium, Seattle, WA, Sep. 18-22, 1993			







	Sul	obstitute for form 1449A/PTO		0	Complete if Known		
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	C28	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987
	C29	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers. San Francisco, CA. August 12-15, 1980
	C30	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989
	C31	Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," IEEE Transactions on Consumer Electronics, Vol. 41, No. 3, August 1995
	C32	Marcus, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994
V	C33	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987

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S.M.		4,795,296	1/3/88	Jau	i igues Appeal
		4,731,603	3/15/88	McRae et al.	
		4,706,294	11/10/87	Ouchida	
-		4,484,191	11/20/1984	Vavra	
		4,464,117	8/7/1984	Foerst	
4		4,414,984	11/15/83	Zarudiansky	
		4,333,070	6/1/1982	Barnes	
+		4,262,549	4/21/1981	Schwellenbach	
1	_/	4,127,752	11/28/1978	Lowthorp	
1.4		3,919,691	11/11/75	Noti	
		2,972,140	2/14/1961	Hirsch	
<u> </u>		RE37,374	9/18/01	Roston et al.	

Exa	Examiner	Cite	Foreign Patent Document			T	Pages, Columns, Lines,	
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			JP	H2-185278		7/19/1990	Taito Corporation	1.32-301-0-503
_		ļ ————	JP	H4-8381		1/13/1992	Epoch Co. and Key- Planning Co.	
			JP	H7-24147		1/27/1995	Sega Corporation	
	\square		JP	H5-192449		8/3/1993	Talto Corporation	
_			WO	92/00559		1/9/1992		
			EP	0607580	A1	7/271994		
			EP	0265011		4/27/1988		
			EP	0626634	A2	5/11/1994		
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	,	OTHER PRIOR ART NON PATENT LITERATURE DOCUMENTS
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		PATRICK, "Design, Construction, and Testing of a Fingertip Tactile Display for Interaction with Virtual and Remote Environments," Master of Science Thesis, MIT, Aug. 1990, archived Nov. 8, 1990.
		CALDER, "Design of A Force-Feedback Touch-introducing Actuator For Teleoperator Robot Control," Bachelor of Science Thesis, MIT, May 1983, archived June 23, 1983.
		WiKER, "Teletouch Display Development: Phase 1 Report," <i>Technical Report 1230</i> , Naval Ocean Systems Center, San Diego, July 1988.
		BLISS, "Optical-to-Tactile Image Conversion for the Bilind," IEEE Transactions on Man-Machine Systems, Vol. MMS-11, No. 1, March 1970.
		JOHNSON, "Shape-Memory Alloy Tactile Feedback Actuator," Armstrong Aerospace Medical Research Laboratory, AAMRL-TR-90-039, August, 1990.
		KONTARINIS et al., "Tactile Display of Vibratory Information in Teleoperation and Virtual Environments," PRESENCE, 4(4):387-402, Harvard Univ., 1995.
		AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.
		EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, Dynamic Systems and Controt: Volume 1, ASME 1994.
		GOBEL et al., "Tactile Feedback Applied to Computer Mice," International Journal of Human-Computer Interaction, Vol. 7, No. 1, pp. 1-24, 1995.
		PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 nd Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.
		Cyberman Technical Specification, Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide, 4/5/1994.
		OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95, Seoul, Korea, 21-24 August 1995.
		KACZMAREK et al., "Tactile Displays," Virtual Environment Technologies, Chap. 9, pp. 349-414.
		LAKE, "Cyberman from Logitech," at http://www.ibiblio.org/GameBytes/issue21/greviews/cyberman.html, 1994.
\mathbf{V}^{\top}		*Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part no. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).

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